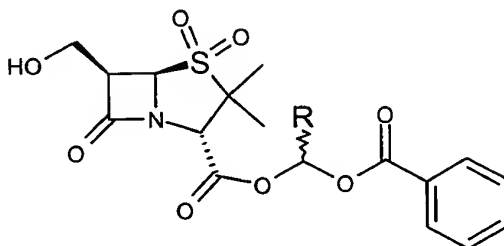We claim:

1. A prodrug having the structure:

wherein R is H or methyl,
and solvates thereof.

2. A prodrug of Claim 1 selected from the group
consisting of:
4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic
acid, 6-(hydroxymethyl)-3,3-dimethyl-7-oxo-,-1-
(benzoyloxy)-methyl ester, 4,4-dioxide
(2S,5R,6R),
4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic
acid, 6-(hydroxymethyl)-3,3-dimethyl-7-oxo-,-1-
(benzoyloxy)-ethyl ester, 4,4-dioxide (2S,5R,6R),
4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic
acid, 6-(hydroxymethyl)-3,3-dimethyl-7-oxo-,(1R)-
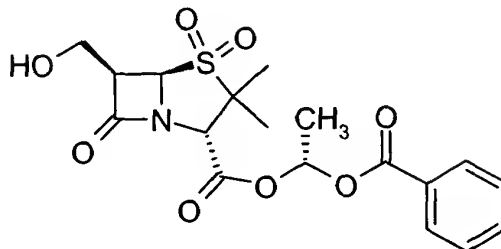1-(benzoyloxy)ethyl ester, 4,4-dioxide
(2S,5R,6R), and
4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic
acid, 6-(hydroxymethyl)-3,3-dimethyl-7-oxo-,(1S)-
1-(benzoyloxy)ethyl ester, 4,4-dioxide
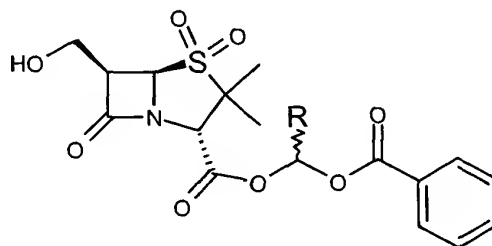(2S,5R,6R).

5 3. A prodrug having the structure:

   and solvates thereof.

10 4. A pharmaceutical composition comprising:

   (a) a prodrug having the structure:

15   wherein R is H or methyl,
          or a solvate thereof; and

   (b) a pharmaceutically acceptable excipient.

   5. A pharmaceutical composition of Claim 4 further
20   comprising a beta-lactam antibiotic.

   6. A pharmaceutical composition of Claim 5 wherein
       said beta-lactam antibiotic is amoxicillin.

25 7. A pharmaceutical composition of Claim 4 wherein
       said prodrug is 4-thia-1-azabicyclo[3.2.0]heptane-

2-carboxylic acid, 6-(hydroxymethyl)-3,3-dimethyl-
7-oxo-,(1R)-1-(benzoyloxy)ethyl ester, 4,4-dioxide
(2S,5R,6R) or a solvate thereof.

8. A pharmaceutical composition comprising:

(a) 4-thia-1-azabicyclo [3.2.0] heptane-2-
carboxylic acid, 6-(hydroxymethyl)-3,3-
dimethyl-7-oxo-,(1R)-1-(benzoyloxy)ethyl
ester, 4,4-dioxide (2S,5R,6R), or
a solvate thereof,

(b) amoxicillin, and

(c) a pharmaceutically acceptable excipient.

9. A method for increasing the therapeutic
effectiveness of a beta-lactam antibiotic in a
mammal comprising administering to said mammal an
effective amount of a beta-lactam antibiotic and an
effectiveness-increasing amount of a prodrug having
the structure:
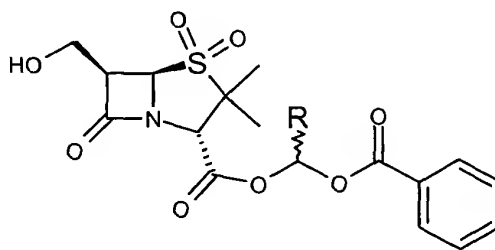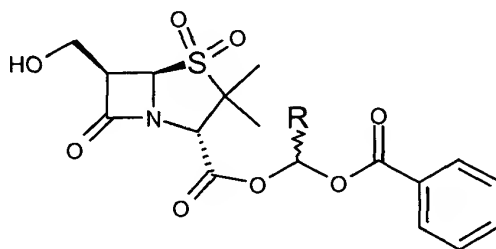

wherein R is H or methyl, or a solvate thereof.

10. A method of Claim 9 wherein said beta-lactam
antibiotic is amoxicillin.

5   11.   A method of Claim 9 wherein said prodrug is 4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 6-(hydroxymethyl)-3,3-dimethyl-7-oxo-,(1R)-1-(benzoyloxy)ethyl ester, 4,4-dioxide (2S,5R,6R) or a solvate thereof.

10

    12.   A method of Claim 10 wherein said prodrug is 4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 6-(hydroxymethyl)-3,3-dimethyl-7-oxo-,(1R)-1-(benzoyloxy)ethyl ester, 4,4-dioxide (2S,5R,6R)

15   or a solvate thereof.

    13.   A method of treating a bacterial infection in a mammal by administering to said mammal an effective amount of a beta-lactam antibiotic and an

20   effectiveness-increasing amount of a prodrug of having the structure:

25   wherein R is H or methyl, or a solvate thereof.

    14.   A method of Claim 13 wherein said beta-lactam antibiotic is amoxicillin.

30   15.   A method of Claim 14 wherein the prodrug is 4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic

acid, 6-(hydroxymethyl)-3,3-dimethyl-7-oxo-,(1R)-1-
(benzoyloxy)ethyl ester, 4,4-dioxide (2S,5R,6R), or
a solvate thereof.

16. A method of Claim 15 wherein the prodrug is
4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic
acid, 6-(hydroxymethyl)-3,3-dimethyl-7-oxo-,(1R)-1-
(benzoyloxy)ethyl ester, 4,4-dioxide (2S,5R,6R), or
a solvate thereof.

17. A method of treating a bacterial infection in a
mammal by administering, to a mammal in need
thereof, a therapeutically effective amount of a
pharmaceutical composition comprising:
(a) a prodrug having the structure:
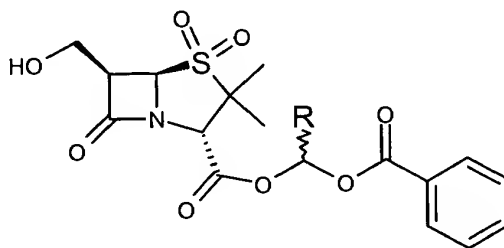
wherein R is H or methyl, or a solvate
thereof; and
(b) a pharmaceutically acceptable excipient.

5 18. A method of treating a bacterial infection in a
       mammal by administering, to a mammal in need
       thereof, a therapeutically effective amount of a
       pharmaceutical composition comprising:
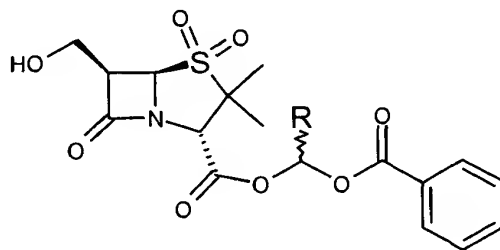
       (a) a prodrug having the structure:

10

       wherein R is H or methyl, or a solvate
       thereof;

15   (b) amoxicillin; and

       (c) a pharmaceutically acceptable excipient.

   19. A method of treating a bacterial infection in a
       mammal by administering, to a mammal in need
20   thereof, a therapeutically effective amount of a
       pharmaceutical composition comprising:

       (a) 4-thia-1-azabicyclo[3.2.0]heptane-
            2-carboxylic acid, 6-(hydroxymethyl)-3,3-
            dimethyl-7-oxo-,(1R)-1-(benzoyloxy)ethyl
25   ester, 4,4-dioxide (2S,5R,6R), or a solvate
            thereof; and

       (b) a pharmaceutically acceptable excipient.

   20. A method of treating a bacterial infection in a
30   mammal by administering, to a mammal in need
       thereof, a therapeutically effective amount of a

pharmaceutical composition comprising:

(a) 4-thia-1-azabicyclo [3.2.0] heptane-2-carboxylic acid, 6-(hydroxymethyl)-3,3-dimethyl-7-oxo-,(1R)-1-(benzoyloxy)ethyl ester, 4,4-dioxide (2S,5R,6R), or a solvate thereof,

(b) amoxicillin, and

(c) a pharmaceutically acceptable excipient.